

# Brief Reports

## Deliberate self-poisoning with Laetrile

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The use of Laetrile as an anticancer agent has been the subject of much controversy in the medical literature in recent years.<sup>1,2</sup> Laetrile, an extraction of ground apricot pits, consists of cyanogenetic glycosides, the principal one being amygdalin.<sup>3</sup>

The toxic effects of amygdalin, which are consistent with those of cyanide poisoning, were noted a century ago, and there are published accounts of fatal poisoning following the ingestion of apricot pits.<sup>4</sup> It is evident that amygdalin is variably metabolized in vitro to cyanide.

The following case report indicates that the ingestion of Laetrile can produce potentially lethal levels of cyanide in the blood, but in this case, unlike previously reported poisonings with Laetrile,<sup>5,6</sup> the patient survived after aggressive therapy for cyanide poisoning.

### Case report

A 32-year-old woman with von Hippel-Lindau's disease underwent resection of a hemangioblastoma in 1976. Subsequently she went to Mexico for treatment at a Laetrile clinic and arranged for a continuing supply of Laetrile upon her return

to Canada. She also took daily a preparation of enzymes thought necessary to activate the Laetrile. Her use of Laetrile for 4 years is outlined in Table I.

In February 1980 she underwent a right nephrectomy and partial hepatectomy for renal cell carcinoma. After a major emotional crisis in May 1980 she ingested 9 g of the parenteral preparation of Laetrile with suicidal intent. She was immediately taken to the emergency department of Victoria General Hospital, Halifax, where the contents of her stomach were removed by lavage. Amyl nitrite was administered by inhalation and 300 mg of sodium nitrite was given intravenously, then 50 mg of sodium thiosulfate was given intravenously and another 50 mg was administered through a nasogastric tube (cyanide antidote package M-76, Eli Lilly & Company [Canada] Limited).

Laboratory studies at the time of her admission revealed severe metabolic acidosis and hypoxemia; the serum cyanide level was 143

$\mu\text{mol/l}$  (385  $\mu\text{g/dl}$ ). Twenty-four hours later the serum cyanide level was 13  $\mu\text{mol/l}$  (35  $\mu\text{g/dl}$ ) and the serum thiocyanate level was 0.22 mmol/l (1.3 mg/dl). After correction of her metabolic abnormalities she had an uncomplicated medical course and was transferred to the psychiatric service for continued management.

Analysis of one of the patient's remaining vials of Laetrile failed to demonstrate free cyanide in the preparation (M. Holzbecher, M. Moss, M.A. Ellenberger: unpublished observations, 1980).

### Discussion

Laetrile has been used in North America as an anticancer agent for 30 years. The proponents of Laetrile claim that malignant cells convert it into hydrocyanic acid in greater concentrations than normal cells. It seems very doubtful that cyanide can selectively kill cancer cells in vitro, and the use of Laetrile has become highly questionable. Currently the drug is banned

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Table I—Patient's use of Laetrile and of enzymes thought necessary to activate the drug

| Time     | Laetrile   |                         | Form of enzyme preparation | Duration of treatment |
|----------|--|-------------------------|----------------------------|-----------------------|
|          | Dose   | Route of administration |                            |                       |
| 1976     | Not known; injected six times per week               | Intravenous             | Enema                      | 3 wk                  |
| 1976-77  | 3 g two times per week                               | Intramuscular           | Tablets                    | 6 mo                  |
| 1977-80  | 3 g once a week                                      | Intramuscular           | Tablets                    | 3 yr                  |
| May 1980 | 200 mg per day<br>9 g of parenteral preparation once | Oral<br>Oral            |                            |                       |

in Canada. The main source of supply is Mexico.

The agent is available in both tablet and injectable form. When taken orally the drug seems to have much greater toxic potential, presumably owing to increased conversion to hydrocyanic acid by intestinal glucosidase.

Previous cases of Laetrile poisoning have been so rapidly fatal that serum cyanide levels could not

be documented. Graham and associates<sup>7</sup> suggested that levels as low as 112  $\mu\text{mol/l}$  could be lethal, but our patient survived a substantially higher level when given prompt therapy for cyanide poisoning.

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## Frostbite arthritis

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Delayed damage to bones and joints is a recognized sequela of frostbite. Harsh Canadian winter conditions can cause frostbite, and the increasing popularity of winter sports has increased the risk of this injury. In approximately half of those affected by frostbite of the hands or feet frostbite arthritis will develop many months or years after the original injury.<sup>1</sup> The characteristic clinical and radiologic features of frostbite arthritis have been well described by others.<sup>1,4</sup> These features, which resemble those of osteoarthritis, are particularly well illustrated by the following case.

### Case report

A 29-year-old man had suffered a frostbite injury to his hands at the age of 16 years; on a night when the temperature was  $-27^{\circ}\text{C}$  he had consumed an undetermined amount of whisky and acetylsalicylic acid at a party and then lost consciousness while he was walking home. He had been outside for  $4\frac{1}{2}$  hours when he was found, semiconscious,

and taken to a local hospital. His frozen clothes were cut off and he was immersed in a bath of water at body temperature. Because the frostbite injury to his hands was so severe and extensive (Fig. 1) he underwent skin grafting. The injury to his knees and feet was less severe and healed without skin grafting or sequelae.

The patient's hands were essentially free of symptoms for 7 years, until, over 3 months, swelling and stiffness developed in the proximal interphalangeal (PIP) joint of the right second finger, followed by similar symptoms in the PIP joint of the left index finger. Six years after these symptoms began his hands appeared osteoarthritic, with an unusual degree of flexion of the terminal phalanges (Fig. 2). Xeroradiographs taken at this time showed flexion of most of the distal interphalangeal joints, loss of bone in some distal phalanges and subchondral cysts, but relatively little narrowing of the joint spaces or evidence of adjacent osteosclerosis (Fig. 3).

At present, 14 years after his injury, the patient has very little joint pain, but describes interphalangeal joint stiffness and some loss of dexterity; these make it difficult for him to play a guitar. His hands are unusually sensitive to cold: ex-

posure produces a purple discolouration and a feeling of discomfort. Laboratory findings, including the complete blood count and the erythrocyte sedimentation rate, were normal; tests for rheumatoid factor gave negative results.

### Discussion

The initial phase of frostbite arthritis can be categorized according to four degrees of severity:<sup>5</sup>

- Erythema, edema and desquamation.

- Vesiculation and loss of several layers of skin.

- Loss of the full thickness of skin, with the digits icy white.

- Immediate bone involvement, with necrosis and subsequent loss of the affected part.

Bone and joint changes may occur weeks, months or years later. The radiologic changes are most pronounced at the distal ends of the digits and may be asymmetrically distributed. Initially these changes involve demineralization; they are sometimes associated with small areas of increased density in the distal tufts or small punched-out subarticular cysts or both. Later, marginal spurs and flexion contractures of the distal interphalangeal joints may occur, sometimes with resorption of the distal phalangeal tufts.

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